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CONSTRUCTION AND EQUIPMENT

No. 70

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CONSTRUCTION

EXPERT REVIEW INTENDED TO IMPROVE CONSTRUCTION DESIGNS, BUDGET ESTIMATES

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 5, May 82 (signed to press 23 Apr 82) pp 2-5

[Article: "Improve the Quality of Design and Budget-Estimating Documentation"]

[Text] The CPSU Central Committee and the USSR Council of Ministers, in the decree, "On Measures for Further Improving Design and Budget-Estimating Affairs," planned a set of measures for improving the system for design work and for raising the quality of design and budget-estimating documentation and the feasibility level of design solutions. Ministries and agencies have already done definite work to implement these measures.

USSR Gosstroy approved and put into effect on 1 January 1982 "Rules on the Composition and Procedure for Developing, Coordinating and Approving Design and Budget-Estimating Documentation for the Construction of Enterprises, Buildings and Structures," which are oriented to the formulation of design solutions that will ensure a high feasibility level for future construction jobs. "The Main Directions for Raising the Technical Level of Construction During 1981-1985" have been developed and have been approved by USSR Gosstroy's Scientific and Technical Council. "Standard Practices Instructions for Determining the Cost of Construction of Enterprises, Buildings and Structures and the compilation of Consolidated Budget-Estimating Computations and Budget Estimates" have been approved. A review of the obsolete standards base for construction and design has been organized. All this will even now enable designs to be developed that will meet the highest requirements for progressiveness and quality.

In monitoring design-work quality, USSR Gosstroy's Glavgosekspertiza [Main Administration for State Expert Review of Designs and Budget Estimates for Construction Work] reviews each year about 1,000 designs for the construction of enterprises and structures of various branches of industry and the national economy. Moreover, ministry and agency documents that generalize the results of expert reviews conducted by agency expert-review organs are studied in detail. An analysis of the results of the review of a large number of design and budget-estimating papers, as well as the data of agency expert review, will enable the quality of design work to be evaluated with adequate completeness and objectivness in regard to both individual branches of industry and the country as a whole. It can be asserted that a persistent tendency toward an improvement of the quality of design work has been observed in recent years. Most designs consider the newest scientific and technical achievements and call for progressive technology and

architectural and constructional solutions that will provide high feasibility indicators for the facilities being designed.

For example, Minkhimprom [Ministry of Chemical Industry], in the design for the first phase of the reconstruction of the Krasnoyarsk Chemical-Fibers Plant, used a new scheme for producing capron-cord fabric, using caprolactam waste that previously was discharged with the waste water. In the design for expanding the Mogilev Khimvolokno Production Association, a consolidated production line was adopted that provides for continuity of the main process, and the labor intensiveness of production and the prime cost of output have been reduced by 7.5 percent.

Expert-review organs of ministries and agencies are exerting a considerable influence on raising the quality of design work. Thus, during USSR Minchermet [Ministry of Ferrous Metallurgy] expert review of a design for the first phase of reconstruction of Moscow's Serp i Molot metallurgical plant, it was proposed to raise production volume at a hot-rolling strip mill that was being designed, by making more complete use of the equipment, which enabled rolled-metal production to be increased 60 percent. The necessity for taking steps to utilize the heat of waste gases from preheating furnaces also was pointed out. Realization of these measures yielded a substantial saving of fuel. Similar suggestions were introduced during USSR Mintsvetmet [Ministry of Nonferrous Metallurgy] expert review of a design for expanding the Ust'-Kamenogorsk Titanium and Magnesium Combine. As a result thereof, production volume was increased by 18 percent for titanium, 5 percent for magnesium.

A reduction in the number of designs that USSR Gosstroy Glavgosekspertiza returned to the ministries and agencies for reworking also testifies to an improvement in design-work quality. Thus, of the designs that were reviewed and were subject to USSR Council of Ministers approval, 25 percent were returned for reworking in 1981, versus 40 percent in 1980. The proportion of designs returned for reworking that had been presented for reapproval because of change in indicators was reduced from 24 to 16 percent during this same period.

At the same time, the number of designs that have important deficiencies is still great. About 30 percent of the designs examined by Glavgosekspertiza under a selective monitoring procedure in 1980 and 1981 were returned to ministries or agencies for reworking.

Many years of experience in expert review of designs testifies to the fact that while the economy is being converted to an intensive path of development, a great benefit can be achieved by introducing modern technology and production organization into design and by using more improved highly productive equipment. The main task here is to use in designs those industrial processes and that equipment that will enable a considerable reduction in the specific consumption of raw and other materials and energy resources, the most complete processing of incidental output, and a sharp reduction in production waste. The importance and urgency with which this question has been posed is demonstrated by domestic and foreign design-work practice.

However, a rise in the technical level of production is not always called for during design. Thus, when the design and budget-estimating papers for construction of the Lyudinovo Foundry of Minavtoprom [Ministry of Automotive Industry] were being examined it was found that unprogressive technology and design of equipment

for mechanical machining work had been adopted, as a result of which the labor intensiveness of the machining of frame parts was 2-fold to 3-fold too high, and the basic industrial equipment was used only 48-63 percent. It was proposed that the technology and structure of the metalworking equipment pool be reviewed and the plant's capacity increased by 25 percent. A large number of similar suggestions were introduced for facilities that were being designed for Mingazprom [Ministry of Gas Industry], Minnefteprom [Ministry of Petroleum Industry], Minkhimprom, and so on.

It should be noted, however, that in many cases a rise in the technical level of the facilities being designed is hindered because of a lack of highly productive and progressive equipment and means for mechanization and automation. Calculations indicate that in metallurgical production the use of electric furnaces with a capacity of 200 tons each instead of the 100-ton capacity furnaces now being used would enable specific capital investment to be reduced 7-8 percent and labor productivity to be raised 15-20 percent. However, domestic machinebuilding ministries are delaying the output of such furnaces. This situation forces USSR Gosstroy to assent, in some cases, considering the necessity for introducing certain facilities into operation on time, using in the designs equipment with inadequately high feasibility indicators.

Some designs call for technology that does not provide fully for reduction in harmful emissions into the atmosphere, bodies of water and the soil. Despite the fact that obtaining output from secondary resources and from production wastes is much more economical in many cases than from natural raw material, the designs do not call for adequate measures to utilize these resources. For example, USSR Minchermet iron-ore enterprises use only 13 million m^3 of 600 million m^3 of stripped rock. More than 440 million tons of blast-furnace and steelmaking-furnace slag have accumulated on the dump heaps. At USSR Mintsvetmet enterprises 455 million tons of unused slag have been piled up at the dump heaps, and each year about 32 million tons of solid waste are formed. USSR Minenergo [Ministry of Power and Electrification] and USSR Mintsvetmet enterprises discharge large amounts of sulfur along with effluent gases.

In order to raise the requirements that enterprise designs use low-waste and waste-free industrial processes, USSR Gosstroy and GKNT [State Committee for Science and Technology] adopted in December 1981 a corresponding decree that called for steps that mandate the study of solutions for the integrated processing of natural raw material, the rational use of wastes that are formed, and the creation of a closed drain-free water-supply system. Expert-review organs have been charged with intensifying monitoring over the use in designs of solutions that provide for rational use of natural raw materials and the introduction of low-waste and waste-free production technology.

To a known extent, many design deficiencies result from the fact that schemes that ministries and agencies work out for developing and siting branches of industry and of the national economy and of productive forces by region of the country still have not become the basis for adopting decisions about design work and the construction of individual enterprises. For this reason, the coordination of all questions about a specific construction project with a large number of branch and regional problems often is not provided for during design work. Tasks associated with the development of production in interdependent industries are not being resolved fully.

The rebuilding and reequipping of existing enterprises do not always receive due consideration during design work. Ministries and agencies often design new facilities without a detailed study of questions linked with the possibility of obtaining additional capacity by reequipping operating facilities with machinery. For example, USSR Minpishcheprom [Ministry of Food Industry] planned the construction of a new fats combine at Volgograd without a detailed justification of the requirement for the output that was planned. During expert review of the design papers it was found that the necessity for building this combine had not been proven, since the capacity of existing enterprises in this region would meet the requirements for this output on the 1990 level. The construction of a new margarine plant within this combine did not make the combine a necessity, since the existing plant's capacity can be increased 1.5-fold.

Cases occur where the ministries unjustifiably adopt decisions to close existing production facilities because they pollute the environment. Thus, USSR Mintsvetmet had planned to eliminate a number of existing production facilities at the Alaverdi Mining and Metallurgical Combine and to build in their stead a new department for producing copper powders. While examining this question, USSR Gosstroy and USSR Gosplan recognized that it was desirable and more effective to retain the existing production facility and to implement a set of nature-conservation measures there. This yielded a saving of the approximate 100 million rubles that the new department would have cost.

Decisions have been made to build certain facilities without due coordination with the prospects for the development of either the given industry as a whole or the interdependent industries. Thus, during a Glavgosekspertiza examination of design papers on the construction in the Moldavian SSR of a USSR Minneftekhim [Ministry of Petroleum Refining and Petrochemical Industry] oil refinery, it was established that the refinery's adopted capacity for primary refining would not be guaranteed by the required amount of crude, which should be sent over the Kuybyshev-Ukraine oil pipelines in 1985. For this reason the documentation had to be reworked in accordance with the Glavgosekspertiza comments prior to its approval.

The CPSU Central Committee and USSR Council of Ministers decree, "On Measures for Further Improvement of Design and Budget-Estimating Affairs," attributes exceptionally great importance to schemes for developing and siting branches of industry and of the national economy and of productive forces by regions of the country, so improvement in the quality of their development should be considered one of the urgent tasks of ministries and agencies. In so doing, questions connected with the priority buildup of capacity at existing enterprises by rebuilding them and reequipping them with machinery, with maximum possible reduction of new construction, merit special attention.

In considering the great national economic significance of these questions, USSR Gosstroy and GKNT have proposed that USSR ministries and agencies and Union-republic councils of ministers require that subordinate design organizations, when they develop designs for the construction of new facilities, compile separate indicators for the labor, material and energy resources per unit of capacity that is being created and for the variant that calls for the rebuilding of existing capacity.

Designers' tasks are increasing considerably in light of the decree that was adopted by the CPSU Central Committee and USSR Council of Ministers, "On Intensification of the Work to Save and to Make Rational Use of Raw-Material,

Fuel-and-Power and Other Material Resources." Glavgosekspertiza's operating experience indicates that there are still designs in which measures for the economical expenditure of resources has not been studied adequately. Thus, for designs that were examined in 1981 and the first 2 months of 1982, Glavgosekspertiza gave recommendations that would enable metal consumption to be cut by 68,000 tons (including 33,000 tons of metal pipe) and fuel-and-power resources expenditures to be reduced by an estimated 2 million tons of standard fuel equivalent.

In the designs of machinebuilding enterprises alone, 395,000 m^2 of production space have been saved and worker manning reduced by 9,300. The realization of Glavgosekspertiza's recommendations for all designs examined during this period will enable water resources in the amount of about 60 million m^3 to be saved. Material and fuel-and-power resources were saved by introducing recommendations for improving industrial processes and equipment, three-dimensional layout solutions and constructional-design solutions.

Glavgosekspertiza's work on examining applications by ministries and agencies to replace reinforced-concrete structure with metal was aimed at the more economical consumption of metal. During 1981 and the first 2 months of 1982, 270 applications were examined in which official authorization to use 195,000 tons of metal (including 142,000 tons of metal pipe) was requested. USSR Gosstroy gave authorization for the use of only 91,000 tons of metal (including 64,000 tons of metal pipe), that is, 48 percent.

Cases occur where ministries and agencies appeal to USSR Gosstroy on questions of replacing reinforced-concrete structure with metal when construction of the facilities had been started or already completed with the use of metal structure. At the initiative of Glavgosekspertiza, USSR Gosstroy called the attention of ministries and agencies to the necessity to coordinate the use of metal structure before the start of construction, noting, in so doing, that in the contrary case, such appeals would not be accepted for review.

Much attention is being paid during expert review of designs to questions of the rational use of land assigned for development. An important factor that allows these questions to be solved rationally is the construction of enterprises within industrial parks. Thus, according to the master plan schemes for industrial parks (the Northern in Krasnoyarsk and the Parnas-IV in Leningrad) that USSR Gosstroy examined and approved in 1981, a reduction of 276 hectares of land was achieved.

A rise in the quality of design work and the effectiveness of construction performance depend directly upon the quality of development of schemes for organizing construction. However, many ministries and agencies do not pay due attention to this important question. Based upon the results of expert reviews, USSR Gosstroy has sent to ministries and agencies a letter directive, "On Improvement of the Development of Schemes for Organizing Construction." Along with this, recommendations were made for refinement of the existing "Instructions for the Development of Schemes for Organizing Construction and Designs for Performance of the Work (SN [Construction Norms] 47-74)," which at present is being reworked and readied for reissuance.

In characterizing the quality of design and budget-estimating documentation, one cannot forget existing errors in determining budget-estimated construction costs. For the designs reviewed by Glavgosekspertiza during 1981 and the first 2 months

of 1982, recommendations were made to reduce the budget-estimated cost of construction by almost 2 billion rubles, of which about 0.9 billion rubles comprised construction and installing operations. The realization of these recommendations during construction of the enterprises under these designs will enable reductions in the consumption of metal by almost 200,000 tons, of cement by 800,000 tons, and of lumber by 400,000 m^3.

There were deficiencies in the work of ministries and agencies in the review of design and budget-estimating documentation on construction projects which had been carried over to the 11th Five-Year Plan with a view to reducing their budget-estimated costs by at least 5 percent. USSR Gosstroy made a check on progress in the work that was being done to reduce the budget-estimated cost of construction, which showed that not all ministries and agencies had approached the organization of this work with the proper responsibility. These should include USSR Minvodkhoz [Ministry of Land Reclamation and Water Resources], Minenergomash [Ministry of Power Machine Building], Minelektrotekhprom [Ministry of Electrical Equipment Industry] and USSR Minchermet. Thus, USSR Minvodkhoz reduced the budget-estimated cost of construction for construction projects carried over to the 11th Five-Year Plan by only 0.5 percent. The ministries did not define the list of facilities whose designs for construction were subject to review.

During a check on fulfillment of the task to review designs, in many cases reserves for reducing construction costs were found, indicating a formalistic approach by some ministries and agencies toward the execution of this work. In some cases many designs were not subjected to review at all, although there were facilities in them whose construction is not necessary now but could be postponed to periods beyond the current five-year plan. Moreover, there are obsolete technical solutions, the exclusion of which would enable construction effectiveness to be raised. USSR Minchermet, in the design of the Oskol Electrical Metallurgy Combine, simplified the previously adopted scheme for cooling castings and for dressing them, enabling the number of retarded-cooling furnaces, bridge cranes and roller tables in the electrical steel-melting department to be reduced. As a result of this, the budget-estimated cost of construction is being reduced by 12.4 million rubles. USSR Gosstroy's review of this design recommended that more powerful shaft furnaces be used, which, along with the execution of a number of other measures, according to the results of the expert review, enabled the budget-estimated cost of construction to be reduced by an approximate additional 19 million rubles.

In working to reduce the budget-estimated cost of construction, it should be kept in mind that in some cases an increase in the budget-estimated cost of construction is caused by the introduction of new scientific and technical achievements for purposes of increasing the enterprises' capacity and the quality of output, improving working conditions, intensifying protection of the environment, and implementing social and economic programs, which, in the final analysis, give a positive national economic benefit.

An important role in further raising the quality of designs is assigned to ministry and agency organs for the expert review of designs and budget estimates. Selective monitoring of the quality of the designs approved by the ministries and agencies, standard-practices supervision of the work of expert review of subunits that is conducted regularly, and the extension to them of the necessary assistance by Glavgosekspertiza affect their work positively. Expert review of

design and budget-estimating papers has begun to be accomplished with a deeper analysis of the design decisions and a more thorough check on the completeness of use of scientific and technical achievements therein.

At the same time, there are still deficiencies in the work of the expert-review organs of certain ministries. In some cases the expert review is not conducted in sufficient depth, and from a parochial standpoint, without a complete discovery of reserves and of the potential for increasing capital investment effectiveness. In some cases expert-review subunits do not pay enough attention to the problems of studying advanced experience in design and construction, to the accumulation and systematization of the necessary information, and to the review and development of the industry's standardizing documents on design work. The industries' fulfillment of recommendations on the designs reviewed is not always monitored.

In attributing exceptionally great importance to expert review in the matter of raising design-work quality, the CPSU Central Committee and the USSR Council of Ministers have required USSR ministries and agencies and Union-republic councils of ministers to reinforce the subunits engaged in expert review of design and budget estimates with skilled personnel and to raise the effectiveness of their work, with a view to intensifying their role in providing for a high level of science and technology and economy in the designs developed.

In light of the new and increased tasks that face expert-review organs, the organization of their work needs considerable improvement. In our view, along with a rise in the responsibility of expert-review organs, their rights also should be expanded.

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CONSTRUCTION MACHINERY

OBSTACLES TO REEQUIPPING CONSTRUCTION MACHINERY PLANTS OUTLINED

Moscow STROITEL'NYYE I DOROZHNYYE MASHINY in Russian No 5, May 82 (signed to press 3 May 82) pp 2-4

[Article by V. I. Vishnyakov, deputy minister of construction, road and municipal machinebuilding: "The Status and Improvement of Capital Construction in the Industry"]

[Text] During the 10th Five-Year Plan Minstroydormash [Ministry of Construction, Road and Municipal Machine Building] assimilated 1,109 million rubles of capital investment, including 904 million rubles for industrial construction. Capacity for the production of 13,600 excavators, 11,000 hoists, 6,800 tons of equipment for the cement industry, 19,000 tons of iron castings, 100,000 tons of steel castings, and 39.4 million rubles' worth of hydraulic drives and hydraulic automation equipment was put into operation. Introduced into operation were 509,000 m^2 of space for main and auxiliary departments, 1,149,000 m^2 of total housing space, and preschool institutions for 7,745 children.

Kramatorsk's Konditsioner Plant, the Borodyanka Excavator Plant and the Faleshty Machinebuilding Plant were built and put into operation.

Major tasks are to be performed during the 11th Five-Year Plan. It is planned to assimilate 1,192 million rubles of capital investment, including 974 million rubles for industrial construction, to introduce into operation capacity for the output of 2,600 excavators, 660 hoists and 1,140 truck cranes, and to build 1,212,000 m^2 of total housing space and preschool institutions for 7,900 children.

CPSU Central Committee and USSR Council of Ministers decrees have established tasks for an accelerated pace in creating capacity for increasing the output of building tools, construction-finishing machines, hydraulic drives, hydraulic automation equipment, and equipment for manufacturing bricks.

For these purposes it is planned to complete construction of the Beloretsk Mechanized Construction Tools Plant, the Vyborg Elektroinstrument Plant, the Dneprorudnoye Construction-Finishing Machinery Plant, the Volkovysk Roofing and Construction-Finishing Machinery Plant, the Tuymazy Ready-Mix Delivery Truck Plant, the Sterlitamak Construction-Machinery Plant and the Uchaly Lumber Machinebuilding Plant.

It is planned to expand and rebuild the Odessa Order of Labor Red Banner Stroygidravlika Plant, with a view to increasing capacity for producing hydraulic drives

and hydraulic automation equipment, and the Odessa Order of Labor Red Banner Heavy Cranebuilding Plant imeni Yanvarskoye Vosstaniye in order to increase capacity for producing large-load cranes.

The Kemerovo Stroymashina Plant, the Simferopol' Machinebuilding Plant, and the Odessa, Ukholovo and Khmel'nitskiy Strommashina Plants will be rebuilt in order to increase capacity for producing brickmaking equipment.

Experience of the 10th Five-Year Plan and of 1981 showed that there are major deficiencies in the industry's capital construction. During 1976-1980 capital investment assimilation fell short by 76 million rubles, which is equal to a delay in the construction of a plant such as the Balakovo Self-Propelled Earthmoving Machinery Plant, with an output of 135 million rubles' worth per year, and a shortfall of 98,800 m^2 in total area of introduced housing.

Actually, there are many objective factors in capital construction that hamper construction progress, such as: lack of adequate capacity of construction organizations in some parts of the country and a lack of balance in plans and in supplying materials and equipment.

However, factors that depend primarily upon us, the clients, greatly affect construction progress. There are cases of delays in releasing sites for building the facilities, late issuance of technical documentation, and absences of developed complexes that are due for early startup and of schedules for the delivery of equipment. Thus, solutions have not been found yet at the Tuymazy Ready-Mix Delivery Truck Plant on ventilation and the purification and discharge of waste water from the galvanizing department. Technical documentation for construction of the third bay of the castings department has not been issued for Ivtormash--Ivanovo's peat-machinebuilding plant.

The startup complexes for the Sterlitamak Building-Materials Plant, the Tuymazy Ready-Mix Delivery Truck Plant, the Uchaly Lumber-Machinebuilding Plant, the Dneprorudnoye Construction-Finishing Machinery Plant and the Volkovysk Roofing and Construction-Finishing Machinery Plant were subjected to reworking.

A lack of monitoring over equipment orders beyond the appropriations that have been made for these facilities has led to a growth in warehouse surpluses, the creation of overdue indebtedness and a lack of normality in settlements with contractors. The following should be included here: the Vyksa Order of Labor Red Banner Crushing and Grinding Equipment Plant, the Donetsk Excavator Plant, Ivtormash--Ivanovo's peat-machinebuilding plant, the Tuymazy Ready-Mix Delivery Truck Plant, the Sterlitamak Construction-Machinery Plant, the Orel Dormashina Association, the Chelyabinsk Order of Lenin Road-Machinery Plant imeni Kolyushchenko, the Dneprorudnoye Construction-Finishing Machinery Plant, the Mogilev Construction-Hoist Plant, and others.

The All-Union industrial associations and the Capital Construction Administration are poorly monitoring progress in the construction of facilities, as a result of which the introduction of capacity at a number of plants has been interrupted.

The introduction of capacity for producing 8.6 million rubles' worth of products at the Dneprorudnoye Construction-Finishing Machinery Plant was delayed only because of late intervention in construction by VPO [All-Union Industrial

Association] chief Comrade V. V. Popov and his deputy, Comrade G. T. Basenik, and the irresponsible attitude of plant director Comrade P. D. Bilyk.

Capacity for producing 16,900 tons of steel castings was not introduced because of the contracting construction organization's failure to meet the deadline for completing installation of a molding line for medium-size castings and the failure of the Volga Order of Labor Red Banner Volgotsemmash Plant to meet the deadline for the manufacture of nonstandardized equipment.

Supervisors of the Odessa Order of Labor Red Banner Plant imeni Yanvarskoye Vosstaniye, who still have not given the design institute the task for the design and do not have yet the document for choice of site for expanding the enterprise, have displayed a lack of concern.

During the 11th Five-Year Plan, principal attention should be paid to the rebuilding and, especially, the technical reequipping of the industry's enterprises.

The plan for 1981-1985 has reduced to the minimum the amount of new construction and of expansion of existing enterprises. While, during the Ninth Five-Year Plan, 18.3 percent of the capital investment was earmarked for new construction, during the 10th Five-Year Plan the figure was 17.4 percent and, during the 11th Five-Year Plan, only 16.2 percent, and, correspondingly, capital investment for expansion was, respectively 49, 38 and 31 percent.

During the current five-year plan, construction will proceed at 11 new construction projects (the Vyborg Elektroinstrument Plant, the Beloretsk Mechanized Construction Tools Plant, the Sverdlovsk Order of Labor Red Banner Plant Pnevmostroymashina imeni Ordzhonikidze, the Vyksa Order of Labor Red Banner Crushing and Grinding Equipment Plant, the Khar'kov Stroygidravlika Plant, the Odessa Order of Labor Red Banner Heavy Cranebuilding Plant imeni Yanvarskoye Vosstaniye, the Orel Road-Machinery Plant, and Odessa Construction-Finishing Machinery Plant, the Ufa Flexible Shaft Plant, and the Kostroma Air-Heater Plant).

The Kostroma Air Heater Plant and the Odessa Construction-Finishing Machinery Plant are to be built by the in-house method.

During the 11th Five-Year Plan the average annual number of projects being built simultaneously is to be reduced from 74 to 49.

On the other hand, technical reequipping, that is, a rise in the technical level of various production sections, units and installations to modern requirements by introducing new equipment and technology, mechanizing and automating production processes, modernizing and replacing obsolete and physically worn equipment with new, more productive equipment, eliminating bottlenecks, and improving the organization and structure of production, should be performed at 97 enterprises.

At the same time, while, until recently, reconstruction and technical reequipping were viewed as practically one and the same thing, beginning in 1982, USSR Stroybank and USSR Gosplan have been severely restricting the financing of technical reequipping, requiring that, in the capital investment structure, no more than 20 percent of the total amount of capital investment for construction and installing work go for technical reequipping.

This requirement has resulted in the industry's not having today designs for industrial reequipping that would correspond to the requirements laid down, and, therefore, the industry faces the task of reworking in the shortest possible time, or, more precisely, of working out new designs for technical reequipping of the industry's enterprises, and both the management of the VPO Soyuzstroymashavtomatizatsiya--Comrades A. A. Tkachenko and I. A. Bestuzhev--and the management of the All-Union industrial associations and the Capital Construction Administration, should thoroughly assimilate them.

During the 11th Five-Year Plan we should reequip 97 enterprises and thereby obtain a growth in capacity for the output of 380 million rubles' worth of goods per year.

Simultaneously, we face the task of sharply increasing work by the economic method. While in past years the amount of construction and installing operations carried out by the economic method varied within the 18-20 million rubles range per year, during 1982-1985 a volume of 22.5 million rubles is planned, and in 1982, 29.1 million rubles, that is, 32 percent more than was carried out previously.

This trend, obviously, will be maintained in succeeding years.

Consequently, the management of the All-Union production associations and enterprises should quickly take steps to further develop the economic method of performing operations--building up capacity and creating construction subunits, especially in those parts of the country where there are no subcontracting construction organizations at all, or they are overloaded with other jobs and cannot perform the work at the industry's enterprises. Posing the question this way is dictated also by the fact that construction organizations are very unwilling to undertake construction work at existing enterprises.

"The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990" state: "Concentrate capital investment in the main areas, at the most important facilities due for early startup, and, primarily, on the reconstruction and technical reequipping of existing enterprises. Build rapidly, economically and at a high technical level."

> The main task of the 11th Five-Year Plan consists in providing for the further growth of the Soviet people's welfare, based on the persistent, advancing development of the national economy, an acceleration of scientific and technical progress and conversion of the economy to the intensive path of progress, more rational use of the country's production potential, a saving in every posible way of all types of resources, and improvement in the quality of work. (From "The Main Directions for the Economic and Social Development of the USSR During 1981-1985 and During the Period up to 1990")

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WAYS TO MAKE BETTER USE OF CONSTRUCTION MACHINERY DESCRIBED

Moscow MEKHANIZATSIYA STROITEL'STVA in Russian No 6, Jun 82 (signed to press 10 May 82) pp 2-3

[Article by P. I. Moiseyev, chief of the Construction Mechanization Section of USSR Gosstroy: "Improve Construction Machinery Management"]

[Text] L. I. Brezhnev emphasized at the 26th CPSU Congress that "...the core of economic policy is becoming a matter that is, it would seem, simple and very prosaic--an economical attitude toward the social good and skill in using completely and desirably everything that we have."

Our country's construction organizations have at their disposal a powerful pool of machinery and transport equipment. Construction is using more than 164,000 excavators, 43,000 scrapers, 160,000 bulldozers, 200,000 cranes of various types, and also a large number of other machines, power tools and means for industrial tooling, in the design of which modern complicated systems of automatic, hydraulic and electrical control are being used widely.

Each year the output of excavators equipped with a wide range of detachable equipment, hydraulic cranes with telescoping booms, tower cranes with increased load capability, automated installations for preparing concretes and mortars, ready-mix delivery trucks, truck-mounted concrete pumps, hole-drilling machines, pneumatic loaders, powerful bulldozers and other construction equipment is being increased.

In recent years the industry has mastered the output of a large number of new types of construction-finishing machines and mechanized tools for construction and installing work. These include painting units for air-free spraying of paint materials, machines for preparing and delivering plaster and mixes, electrical hammers and pneumatic drills, power nut-drivers, electric drills and screwdrivers with electronic control over the working implement's rotating speed, and so on.

Construction organizations are manufacturing at their enterprises much specialized motor-vehicle equipment, various types of industrial tooling, and small mechanization equipment that will enable manual labor expenditure to be reduced and materials to be saved when construction and installing work is done.

During the 10th Five-Year Plan alone the value of the construction machinery pool rose from 11 to 18 billion rubles. More than 90 percent of the main labor-intensive operations at construction projects are now being performed with machinery;

25 percent of the workers in construction are engaged in driving machines or repairing them, the rational organization of whose operations affect positively the labor productivity of interdependent trades.

Improvement in the use of machinery at construction projects harbors a great potential for a further rise in effectiveness and labor productivity in construction. However, as an analysis has indicated, by operating machines only during the daytime, in 8-10 hours worktime losses within the shift sometimes reach 18-20 percent. This occurs because of the lack of preparation of a work front and late or incomplete delivery of structure, parts and materials.

Only operating machines build the construction product. Inoperable machines create production losses, and the more expensive they are the greater the losses. In order to eliminate these losses, the organization and planning of construction and installing work performance must be improved. A basic area for improving construction work performance is scientific organization of the management of construction and installing operations, taking into consideration the specific conditions for the execution thereof and the provisioning of material, labor and technical resources.

The main improvement in the management of the construction machinery pool is a rise in the technical level of development of PPR [planned preventive maintenance] and in the responsibility of supervisors of construction operations for staying within the norms for maintenance of technical equipment during these operations.

A number of mechanization trusts and administrations restrict their activity just to the assignment of machines to projects. They are not adequately engaged in organizing the effective use of machinery and improvement in methods for performing mechanized work, a fact that affects negatively the rise in the technical level of work performance.

A decree about the tasks and functions of mechanization trusts and administrations that USSR Gosstroy has approved calls for these construction subunits to take part in organizing the construction process and in making settlements for operation of the machines for the standard time of their working, and also for the actual amounts of work done.

The use of such settlements between construction organizations and mechanization administrations and trusts will stimulate the necessity for a careful technological study of organization of the work of the machinery that takes into account the concrete conditions of the work front and provisions for the delivery of parts and materials. Consequently, provisions should be made for mutually coordinated operation of the machines and organization of the work at the construction project. This will increase the responsibilities of the parties for use of the equipment and for observance of the work-performance technology. Therefore, the operational services of mechanization trusts and administrations are obliged to exert an active influence on the use of machinery that is delivered and to solve responsively current questions associated with providing for the performance of mechanized operations during the operating process of construction, which have been aimed at reducing manual labor.

However, there are still frequent cases where work is performed manually, even on jobs where mechanized equipment is available. These cases indicate that questions

of reducing manual labor and improving work organization have not become for technical personnel paramount tasks that will provide not only for a rise in labor productivity but also for the solution of some questions of a social nature.

Major reserves for improving the use of machines can be realized by further improving technical servicing.

The work experience of mechanization trusts, in which the equipment of regional construction main administrations is concentrated, confirms that the concentration of the machinery in these organizations creates the best circumstances for the technical maintenance of the fleet, for training, and for manning by skilled machinery operators, who can solve modern questions of mechanizing construction.

Construction mechanization trusts and administrations, using the advantages of specialization of operations for technical servicing and repair, are successfully reducing the time spent on repair and redeployment, providing for higher production.

Concentrating machines in specialized regional mechanization administrations and trusts will enable planned preventive maintenance to be organized better, the more rational use of spare parts and a capability for restoring them, and the elimination of numerous deficiencies connected with the bureaucratic approach to the use of construction equipment.

The development of a centralized control service in these organizations, equipping them with modern technical means for radiotelephone communications with the construction jobs (with the servicing vehicles and with operator crews), will raise sharply the responsiveness of management of operation of the machinery on the line and will provide for high flexibility thereof and a reduction in repair time.

The wide use in the machinery of hydraulic systems, modern devices for electric drive and automation, and more complicated design of components, along with a substantial growth of the machinery pool, requires the creation and equipping of technical maintenance services with special expensive stands, installations and diagnostic devices, and also the training of highly qualified specialists for executing repair and adjustment work. These questions are being solved most successfully of all and with effectiveness by specialized organizations for maintaining machinery.

Therefore, the execution of further specialization in the technical maintenance of construction machinery, mechanized tools and means of small-scale mechanization is one of the main prerequisites that provides for a rise in the effective use of construction equipment.

"Today's demographic situation," L. I. Brezhnev emphasized at the November 1981 CPSU Central Committee Plenum, "requires better use of labor resources....The root of the evil is the slow reduction of manual labor."

About half of the workers in construction are engaged in manual labor, and the reduction in this category of worker is proceeding extremely slowly.

The problem of reducing manual labor use in performing operations should be solved by a set of measures associated with the design, organization and technology of performing the work, and also the wider mechanization of manual labor. In accordance with the 1981 plan for integrated mechanization, the amounts of work done manually per estimated 1 million rubles' worth of construction and installing work has been reduced by 11 percent for earthmoving work, 6.4 percent for concreting, plastering and painting operations, and by 8.5 percent for loading and unloading work.

Along with a reduction in specific work volume for 1981 versus 1980, the absolute amount also was reduced by 8 percent for earthmoving and by 2.8, 3.8 and 2 percent for, respectively, concreting, plastering and painting work.

However, the construction organizations of some ministries, agencies and Union-republic councils of ministers did not fulfill 1981 tasks for reducing the amount of work done manually.

A similar situation exists in construction organizations that are subordinate to the Uzbek SSR and Kazakh SSR councils of ministers in regard to the unloading of quarried materials, in organizations of Union subordination of USSR Minvodkhoz [Ministry of Land Reclamation and Water Resources], the Mosgorispolkom [Moscow City Ispolkom] and a number of Union republics in regard to the loading and unloading of constructional structure, timber and metals, and in organizations of Glavnechernozemvodstroy [Main Administration for Water-Resources Construction in the Nonchernozem Zone] of USSR Minvodkhoz, USSR Mintyazhstroy [Ministry of Construction of Heavy Industry Enterprises], Glavmosoblstroy [Main Administration for Construction in Moscow Oblast] under the Moscow Oblast Ispolkom, and the Uzbek SSR Council of Ministers in regard to the loading and unloading of cement. The amounts of manual labor in Glavnechernozemvodstroy organizations of USSR Minvodkhoz and of a number of Union republics in regard to concreting, plastering and painting work have grown. Organizations of Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises], USSR Minugleprom [Ministry of Coal Industry], Mintransstroy [Ministry of Transport Construction] and the Latvian SSR did not carry out the tasks established for 1981 for reducing work performed manually during finishing operations.

The fulfillment of tasks established by the plan for integrated mechanization and automation of construction and installing work during 1981-1985 requires systematic work and great attention by construction organizations to improvement of the management of the high-capacity construction equipment pool.

In order to insure plan fulfillment, construction organizations should: concentrate special attention on the execution of measures for supporting labor productivity growth, reducing the use of manual labor, and increasing the utilization effectiveness of construction equipment. In order to do this:

improve the organization of construction and installing work, based upon a rise in the technical level of development and realization of designs for performing the work, and an increase in the responsibility of workers for executing the plans;

perform earthmoving work, as a rule, by the mechanized method below the designed grade level with the wide use of mechanization equipment that has been created and of advanced methods for performing the work;

pay special attention to observance of the requirements of the construction norms and regulations for compacting the soil during backfill;

introduce widely advanced methods for doing plastering, painting and other finishing work operations, using new means for mechanization, furnish brigades with standardized sets of operating mechanization equipment, tools, implements and contrivances, and also reduce the amount of work that uses "wet" processes;

raise the level of technological preparation and organization of mechanized operations and of technical and economic indicators for the planned preventive maintenance of machinery, based upon actual time operated;

complete in 1982-1985 the conversion of existing concrete-and-mortar departments and plants to automated operating regimes and thereby reduce cement consumption and labor expenditure during the preparation of concretes and mortars;

reduce greatly labor expenditure for loading and unloading work by developing containerized and packaged delivery of construction freight and by improving the organization of making up complete sets of equipment and of storage operations;

call for the wide use of new equipment and progressive resources-saving technology, such as: "the soil wall," pipeline transport for the delivery of concretes and mortars, the conduit-free laying of utility and service lines, the air-free application of paints, the fastening of structure with the use of modern methods, the boring of holes in concrete by means of diamond tools, the mechanized application of waterproofing, and the use of thrust-type clamshell buckets and hydraulic hammers, and other items; and

organize the training of workers, engineers and technicians in the use of new, highly productive machines and mechanized tools and of new operating processes.

Competing in honor of the 60th anniversary of the founding of the USSR, many mechanization trust and administration collectives of the construction ministries have achieved good results. The experience of some of them is publicized in this issue of the journal.

11409
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BUILDING MATERIALS

CONSERVATION OF BUILDING MATERIALS URGED

Moscow BYULLETEN' STROITEL'NOY TEKHNIKI in Russian No 6, Jun 82 (signed to press 25 May 82) pp 2-6

[Unsigned article: "Conservation of Material Resources in Construction" under the rubric "Translate Into Reality the Decisions of the 26th CPSU Congress!"]

[Text] In April 1982 the All-Union Conference on the Conservation of Material Resources in Construction was held in Moscow under the auspices of the USSR Gosstroy jointly with the NTO [Scientific and Technical Society] of Construction Industry and the construction ministries. The participants in the conference included responsible workers of the CC CPSU, the USSR Council of Ministers, the CP CCs of the Union republics, and kray and oblast party committees, as well as the heads of a number of ministries and departments, design and research institutes, construction and installation organizations, construction industry enterprises, and the CC of the Trade Union of the Workers of the Construction and Building Materials Industry.

The conference was inaugurated by the chairman of the Central Board of the NTO of Construction Industry, Deputy Chairman of the USSR Gosstroy, I. I. Ishchenko, who pointed to the importance of working out effective ways of achieving the planned conservation of resources in construction. Many progressive projects of the institutes of USSR Gosstroy are being introduced into practice, and this will serve to save by 1985 about 1.5 million tons of metal and more than 2.5 million tons of cement.

Within the construction industry one comprehensive targeted program and 11 principal scientific and technical programs encompassing the entire cycle of work--from research and development to introduction into construction practice--have been drafted. Jointly with the ministries and departments the USSR Gosstroy commenced in 1981 to implement the program for the conservation of fuel and energy resources in construction Plans exist to introduce less energy-intensive technologies and heat transfer systems at the enterprises of the construction industry. The institutes of the USSR Gosstroy are working to refine norms and standards.

Another speaker was the head of the Department of Construction at the CC CPSU, I.N. Dmitriyev, who stressed that in the Formal Report of the CC CPSU to the 26th Congress of the Communist Party comrade L. I. Brezhnev especially pointed out that our further progress will increasingly depend on the skillful and effective utilization of all available resources--labor, fixed assets, fuels and raw materials,

and crop and livestock products. Questions of conservation and thrifty management in our country's capital construction, which consumes roughly 12 percent of the output of the sphere of material production in terms of value and about 35 percent in terms of tonnage, are of primary importance. Every additional percent of material resources wasted in construction amounts to nearly 500 million rubles annually.

Specific ways of solving the problem of an economical and thrifty attitude toward national wealth are contained in the Decree of the CC CPSU and the USSR Council of Ministers "On Intensifying the Work to Save and Rationally Utilize Raw-Material, Fuel and Energy, and Other Material Resources." Following this decree, the collectives of construction projects and construction-industry enterprises began to pay more attention to problems of conservation and thrift, as did the party and trade-union organizations.

So far, however, a radical turnabout still has not taken place in improving the utilization of material resources in construction. Engineers have not been sufficiently oriented toward the solution of these problems and the experience of innovators and initiatives of leading collectives are not being sufficiently disseminated. At some ministries and departments the work on the conservation of material resources is not yet sufficiently specific and active, and losses of building materials, and structural elements and components are being tolerated on many construction sites. Considerable funds are being expended on remedying defective work and the errors of designers. On the whole, the volume of losses and inefficient utilization in construction is estimated at nearly 2 billion rubles a year.

A special place in the system of measures for the conservation of material resources in construction is occupied by an efficient utilization of electrical energy and fuel. The mean unit consumption of fuel in the production of precast reinforced concrete is nearly double that of the standard and in the last 5-6 years it has virtually not decreased. Most reinforced concrete products are cured in pit chambers having a 10-15 percent efficiency. Energy-saving technologies, various chemical additives, economical techniques of the heat treatment of products, and other techniques for intensifying production processes are introduced too slowly.

The less costly outdoors technique of the production of reinforced concrete, which does not require curing, is being unjustifiably curtailed. In the opinion of experts, this method can be effectively employed at more than 250 precast reinforced concrete plants located in the nation's southern zone.

"The Main Directions of Economic and Social Development of the USSR During 1981-1985 and for the Period Until 1990" provide for the preferential development of the output of products assuring a decrease in the metal-intensiveness, cost, and labor-intensiveness of construction, a reduction in the weight of buildings, and an increase in their heat insulation. Accordingly, the USSR Gosstroy, the ministries and departments, scientific research and design institutes, and enterprises of the construction industry should focus attention on increasing the output of progressive highly industrialized materials, structural elements, and products and increasing the degree of their off-site prefabrication and quality.

The necessity of the mass production of gypsum products for use in construction is acute. Special attention should be devoted to a broad application of improved dry gypsum plaster in industrial partitions.

The currently employed techniques of protecting metal against corrosion are unreliable and labor-consuming. Specialists have calculated that, for the country as a whole, hundreds of thousands of tons of metal are lost annually owing to corrosion-caused disintegration of metal and reinforced-concrete structural elements. The USSR Gosstroy and its institutes should analyze this problem and correspondingly revise the design standards. Substantial excess consumption of metal in the production of precast reinforced concrete is due to unjustified replacement of shapes and classes of steel, poor quality of production, and deviations from design solutions.

Of major importance are theproblems of a thrifty consumption of lumber in construction. The production and application of effective wood substitutes such as waterproof plywood, tile materials, parquet board, etc. should be expanded and broadened.

Improvements in design harbor a considerable potential for improved conservation of materials. Incentives should be more readily granted to designers and made contingent on the economicality of their design solutions and the extent to which they reduce material and manpower resources on construction sites. The matters should be so organized that all new and progressive solutions would be incorporated more rapidly in designs and applied without delay on construction sites.

Of major importance to the efficient utilization of resources are economically justified shifts in the geographic pattern of distribution of construction industry facilities as well as the specialization and co-production of enterprises. The existing shortcomings in the development and pattern of distribution of these facilities should be resolutely eliminated. Every republic, oblast, and rayon of concentrated construction should maximally utilize its own local building materials.

The material and moral responsibility of those taking part in the wasting of resources on construction sites should be clearly defined. An explicit procedure for their accounting, storage, and deletion should be introduced, along with a requirement that the culprits reimburse losses due to defective work, damage to materials and structural elements, and their overconsumption or shortage.

Many tasks of the conservation and efficient utilization of raw-material, fuel and energy, and other material resources in construction should be solved by improving the machinery of management. Cost-effectiveness principles should be more broadly introduced in the work of brigades. The brigade system is not just a fad but the general line toward increasing the effectiveness of capital construction.

In conclusion, the head of the Department of Construction at the CC CPSU I. N. Dmitriyev stressed the important role of the primary party organizations and party groups on construction sites and at construction-industry enterprises in the nationwide movement for conservation and thrift.

The principal directions of the conservation of material, fuel, and energy resources at the USSR Ministry of the Construction of Heavy-Industry Enterprises (Mintyazhstroy) were described to the conference participants by USSR Mintyazhstroy Minister N. V. Goldin. To fulfill the planned volume of their operations, the construction organizations of this ministry annually consume more than 3 million tons of metal products, 10 million tons of cement, 4 million cu m of lumber, 570,000 tons of automotive gasoline, 670,000 tons of diesel fuel, and large quantities of other resources. Reducing this consumption by just 1 percent would yield considerable savings to the national economy.

The ministry pays considerable attention to a maximal introduction of efficient design-layout solutions and the use of economical structural elements and effective materials. Thus, in recent years, more than 20 million sq m of industrial floor area on the principal construction sites was built from new structural elements and materials; about 25 million sq m of lightweight partitioning elements was installed, and 23 million sq m of effective heat insulating materials was installed as well. This made it possible to reduce the weight of buildings by more than 6 million tons and to reduce the labor-intensiveness and schedules of construction as well.

Substantial savings are produced by a timely and attentive scrutiny of design solutions. Thus, the office for design solution expertises that has been established at the Glavsreduralstroy [Main Central Urals Construction Administration] examined designs of 23 projects with an aggregate construction and installation cost of approximately 200 million rubles and, as a result, it could reduce the volume of construction and installation operations by 11 million rubles and save the national economy 4,000 tons of metal, 6,000 tons of cement, and large quantities of other resources.

To promote the measures to conserve material and technical resources, the USSR Mintyazhstroy is introducing new capacities for the production of economical structural elements and materials. The construction of the Chelyabinsk Gypsum-Fiberboard Plant is nearing completion: its introduction will serve to eliminate wet processes in the installation of 3 million sq m of wall partitions. At Pervoural'sk a plant manufacturing complete sets of metal structural elements is reaching its designed capacity. The use of these elements will serve to reduce metal consumption by 140,000 tons annually. The activation of the Chelyabinsk Mineral-Wool Plant will result in reducing cement consumption by 500,000 tons annually.

The ministry is doing extensive work to develop high-capacity means of mechanization serving to not only increase labor productivity but also conserve building materials. Thus, the use of a set of machines consisting of truck-mounted concrete pumps and concrete mixers will make it possible to prevent losses of concrete during its transportation and application, which under the existing technology amount to about 3 percent.

The measures to conserve fuel, energy, and material resources taken by the USSR Ministry of Industrial Construction were described by its head, Minister A. M. Tokarev. The pertinent work proceeds chiefly in the direction of improvements in

production technology, application of effective building materials, and improvements in standards for the consumption of material resources. These and other measures enabled the organizations of this ministry in 1981 to save 62,000 tons of rolled metal stock, 168,000 tons of cement, 120,000 cu m of lumber, 293,000 sq m of glass, 66 million kwh of electrical energy, etc.

An important direction in the ministry's work is the organization of the supply of construction sites with materials, products, and structural elements in the form of complete technological sets based on the production-technological complementation system. The broad introduction of finishing operations with respect to building materials at UPTK bases enhances their offsite readiness and reduces the consumption of materials. The centralized cutting and kit-assembling of window glass alone are expected to save as much as 10 percent of that glass. During the Five-Year Plan period the centralized production of about 50,000 containers and means of packaging for the ministry's organizations will be accomplished, which should serve to reduce the losses of cement, slate, and soft roofing by 6 percent; losses of bricks, by 10 percent; and losses of glass, by 12 percent.

The transport enterprises of the USSR Ministry of Industrial Construction employ trailer trucks on a broad scale, which serves to save about 7,000 tons of diesel fuel annually. In 1981 industry produced 975 trailers and semi-trailers for the organizations of that ministry, and prepared for production a dump-truck trailer with an 8-ton load capacity. Plans exist to further expand centralized hauls of building materials (by 76 percent) and to increase the number of driver brigades operating by the brigade-task method.

The mobilization of the collectives of the organizations and enterprises of the USSR Ministry of Building Materials Industry to increase the effectiveness of utilization of raw and other material resources as well as fuel and energy resources was described by the head of that ministry, Minister A. I. Yashin. The work on conservation and thrift is being done by that ministry in several directions, one of which is the preferential manufacturing of products assuring a decrease in the materials-intensiveness, cost, and labor-intensiveness of construction as well as in the weight of buildings and structures, along with an increase in their heat insulation. Another direction is the acceleration of the development and introduction of energy-saving technologies in the production of cement, glass, and lime; economical techniques of the heat treatment of reinforced concrete and kilning of ceramic products; effective methods of insulating thermal equipment; and recovery of secondary heat. An important direction is the conservation of all kinds of raw and other materials, reduction in the materials-intensiveness of the products manufactured, and a fuller utilization of the wastes of other production sectors.

The production of most of the various types of building materials is highly fuel- and energy-intensive. The ministry's enterprises annually consume up to 48 million nominal tons of fuel and more than 27 billion kwh of electrical energy. This accounts for a substantial share in the nation's overall fuel balance sheet. Measures to conserve fuel and energy resources represent the basis of the broad scientific and technological programs developed by the ministry.

The principal direction of the conservation of fuel in the cement industry will be the further development of the dry process of production. During the current

Five-Year Plan period the production of cement by this method will have increased by 3.5-4.0 million tons. In the glass industry, fuel will be more economically utilized by implementing a complex of measures to heat-insulate furnaces, using efficient fuel-burning devices, increasing the glassmaking temperatures, and augmenting the recovery of heat from waste gases. To exploit the considerable potential for conserving fuel and energy resources in the brick industry, measures are being taken to elevate the technological level of the production of construction bricks.

The principal ways of reducing the materials-intensiveness of construction were described by USSR Deputy Minister of Construction S. Ye. Yakubanets. He emphasized that revisions of standards represent a major potential for the conservation of materials. The structural and layout solutions applied in the designs of enterprises, buildings, and structures largely predetermine the consumption of resources for their erection. Problems of the formation of industrial complexes, extensive interconnection of discrete buildings, reduction in the length of intershop routes, increase in the length of roads, use of lightweight structural elements, reduction of wall partitions in production buildings--such is the basic list of measures which should be considered when designing enterprises, facilities, and structures, and when receiving blueprints from customers.

The conservation of material resources in construction is assisted by the introduction and strengthening of the brigade method. This form of organizing operations shortens construction periods, improves the quality of construction, and conserves materials. Brigades based on the cost-effectiveness principles carefully verify the quality of the materials arriving on the construction site and organize their storage in a manner precluding damage. Further, they employ rational methods of on-site transportation and prevent loss and waste during operations.

Of great importance are the commissions for monitoring the thrifty utilization of materials that have been set up at a number of ministries. Their principal task is systematic engineering work to bring into order the production activities of the subordinate subdivisions with respect to the conservation of materials. The commissions exercise regular monitoring of the development and implementation of measures to conserve material and equipment resources.

The conservation of material resources in installation and special operations was describedby USSR First Deputy Minister of Installation and Special Construction Operations S. V. Podobedov. The activities of that ministry's organizations this year will reach a volume of 9.4 billion rubles, and they all involve the consumption of considerable quantities of material resources. Each year the ministry processes about 6 million tons of metal products, consumes 1 million tons of conditional fuel, and uses more than 3.2 billion kwh of electrical energy. In 1981 alone 82,000 tons of ferrous metal were saved in the performance of special and installation operations.

The principal directions of the conservation of ferrous metals are: the use of high- and higher-strength steel, economical rolled sections, and lightweight metal structural elements in complete sets; improvements in the technology of operations, and the rationalization of design solutions. Thus, during the current Five-Year Plan period utilization of effective rolled sections in the fabrication

of structural elements will have increased by nearly 400,000 tons, and the utilization of broader I-beams, by more than 750,000 tons. In 1985 compared with 1980 the use of progressive floor elements will have tripled, which will serve to reduce the consumption of ferrous metals by 19,000 tons.

The ministry's organizations employ ever more broadly plastic and glass pipe for construction. In 1981 a total of 5,600 tons of plastic pipe and 4,400 tons of glass pipe was installed, which served to save more than 30,000 tons of steel pipe. In 1985 the use of plastic pipe will be roughly doubled and the use of glass pipe, expanded by a factor of 1.5.

First Deputy Minister of Transport Construction N. I. Litvin described his ministry's experience in conservation and thrift. Within that ministry, organizational and technical measures were drafted to conserve resources by developing and introducing new structural elements and materials, improving construction technology, introducing progressive operating techniques, etc. These measures provide for conserving the following quantities by 1985: 7.6 percent of ferrous rolled stock, 7 percent of cement, 8.9 percent of lumber, 10 percent of electrical energy, etc.

A central commission dealing with the development and introduction of measures to conserve building materials is being set up within the Ministry of Transport Construction. Attached to this commission are nine teams bearing responsibility for monitoring the implementation of measures to conserve discrete types of materials. The commission has examined the results of the public inspection of the quality of the storage of material and fuel-energy resources, aspects of the condition of surplus inventories of material resources at the ministry's organizations, the dissemination of advanced knowhow in the conservation of resources, etc.

The experience gained in the rational utilization and conservation of basic materials on the construction sites of the energy industry was described by USSR Deputy Minister of Energy Industry and Electrification V. A. Kozhevnikov. For the current Five-Year Plan period the ministry has drafted a plan for the introduction of measures to conserve basic materials and fuel and energy resources. In particular, this plan provides for increasing, during that period, the output of prestressed reinforced-concrete products and structural elements by 9 percent; the supply of reinforcement steel and rolled metal shapes in discrete lengths, by 10 percent; the output of plasticizer-treated concrete mixes, by 15 percent; and the output of ash-treated concrete mixes, by 6 percent. The ministry's organizations have introduced a uniform system of reporting on the implementation of tasks relating to the conservation of metal, cement, and lumber.

The Chairman of the CC of the Trade Union of the Workers of Construction and Building Materials Industry, I. A. Lanshin, emphasized in his speech that the task of conserving and rationally utilizing building materials and products is of national importance and among the principal tasks of the current Five-Year Plan. The implementation of measures to strengthen conservation of resources as outlined by the 26th CPSU Congress, is of great importance to the work of trade-union organizations. The nationwide competition of builders, designers, and construction-industry workers, launced under the slogan "Work Effectively and Well!" is intended to promote

a civic attitude toward public property, a competent and efficient utilization of the existing resources, and the attainment of maximum results at minimum cost.

An important role in enhancing the effectiveness of construction production belongs to the mass introduction of the cost-effective brigade method. At present some 40 percent of the total volume of construction and installation operations is performed by this method. Toward the end of the current Five-Year Plan period cost-effective brigades will handle at least 55-60 percent of the operations, with all house-building combines to be converted to this organizational form.

Four sections were active at the conference: "Conservation of Material and Energy Resources Through Improvements in the Organization and Technology of Construction Production," "Conservation of Material and Fuel-Energy Resources in the Construction Industry," "Conservation of Material and Fuel-Energy Resources in the Building Materials Industry," and "The Development of Socialist Competition to Conserve Material Resources: Organizational Work in the Collectives."

The conference participants adopted an appeal to all workers of construction, research, and design organizations as well as of enterprises of the building materials and structural elements industry. The appeal points out that a thrifty and civic-minded attitude toward public property in construction has not become the norm everywhere. It is necessary to multiply effort in the struggle against poor management, waste, losses, and unproductive expenditures.

Capital construction is one of the most materials-intensive sectors of industry; it is the largest consumer of cement, reinforced-concrete products, lumber, glass, bricks, structural metal elements, many other materials, and fuel and energy resources. Given the current volume of their consumption, every percent of material resources conserved, just like every percent of these resources wasted, means to the state hundreds of millions of rubles, huge material values, each year.

The appeal stresses that the problem of conservation and thrift has at present acquired a tremendous social and political importance. It cannot be tolerated that even a minuscule part of the product of labor be irreversibly lost, damaged, or dissipated.

The conference participants appealed for a more persistent and energetic implementation of the Decree of the CC CPSU and the USSR Council of Ministers, "On Intensifying the Work to Conserve and Rationally Utilize Raw-Material, Fuel-Energy, and Other Material Resources." All existing potential for conservation should be more fully exploited, order should be brought into the accounting, storage, and consumption of resources, and efforts should be made to reduce the materials-intensiveness of construction.

The conference expressed the conviction that the workers of construction and installation organizations, research and design institutes, and enterprises of the building materials and construction industry will achieve new successes in the nationwide movement for conservation and thrift. This will serve to make a worthy contribution to implementing the task, posed by the 26th CPSU Congress, to further augment the country's economic potential and improve the welfare of the Soviet nation.

The concluding speech was given by the head of the Department of Construction at the CC CPSU I. N. Dmitriyev, who pointed out that the conference worked out a program of specific and useful measures. The main thing now is to translate them into reality. To this end, the work on every sector of capital construction should be performed in a well-organized manner, with a feeling of great responsibility, on persistently imbuing everyone with a civic-minded and thrifty atttitude toward public property. The advances scored in this direction are tantamount to multiplying our country's wealth.

1386
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EFFICIENCY OF LIGHT-CONCRETE BUILDINGS EVALUATED

Moscow BETON I ZHELEZOBETON in Russian No 4, Apr 82 (signed to press 11 Mar 82) p 2

[Article: "Effectiveness of the Comprehensive Use of Lightweight Concrete Components"]

[Text] The resolutions of the 26th CPSU Congress anticipate the preferential development of the production of items which ensure a lowering of construction cost and labor intensiveness, reduced building and structure weight and better thermal insualtion. Components based on light concrete fully meet these demands.

The NIIZhB [Scientific Research Institute of Concrete and Reinforced Concrete], with the participation of the NIIES [Scientific Research Institute of Construction Economics], TsNIIPromzdaniy [Central Scientific Research, Planning and Experimental Institute of Industrial Buildings and Structures], TsNIIEP zhilishcha [Central Scientific Research and Planning Institute of Standard and Experimental Housing Planning], TsNIIEPsel'stroy [not further identified] and NIISK [Scientific Research Institute of Construction Components] has studied the economic effectiveness of the comprehensive use of light concretes in industrial, housing and agricultural construction with consideration of local conditions. The evaluation was made by comparing the modular-layout and structural resolution of a representative light-concrete building with an analogous heavy-concrete building.

We chose to represent single-story industrial buildings by a block-style square building 72 meters on a side, with 18-meter (4 x 18) spans, six and 24-meter (3 x 24) column pitch and 12-meter column pitch. The buildings had fully reinforced concrete frames and roofs in the form of segmented girders and 3 m wide corrugated sheet. The spans were in parallel, without drops in height between adjacent spans. In the building with an 18 x 6 meter column grid, the spans were put in by two 3.2-ton suspension crane jibs, and in the building with a 24 x 12 meter column grid -- by 20/5-ton overhead cranes. The base mark for the support components was 7.2 meters in the first instance and 10.8 meters in the second.

We chose to represent multistory industrial buildings by an I.420 series four-story building with 4.8-meter stories and a fully reinforced concrete frame (column grid 12 x 6 meters) designed for an effective span load of up to 1,000 kg-force/square meter. The building was rectangular in shape (36 x 60 meter sides) with parallel spans and no drop in adjacent span heights.

For housing construction, we chose a standard series III.99 large-panel building with a narrow transverse bearing wall pitch. We examined a nine-story with dimensions corresponding to one section of a standard floor. For comparison, we chose a standard series III.90 large-panel heavy-concrete house.

The production-type single-story agricultural buildings had a stanchion-girder or single-span frame arrangement. The buildings were rectangular, with 18 x 72 meter sides, a fully reinforced concrete frame and a roof of prefabricated reinforced concrete truss components, in addition to buildings with half-frames. The longitudinal column support pitch was six meters and the transverse pitch in stanchion-girder buildings was six meters (3 x 6).

We chose administrative regions with low and high levels of claydite gravel wholesale prices: Kuybyshevskaya Oblast -- under five rubles per cubic meter; Tomsk, Tynda, Khabarovsk and others -- more than 12 rubles/m^3, as well as regions with practically no natural rock reserves. Regional features were taken into account in this selection: concentration of specific types of construction-installation work; availability of prefabricated reinforced concrete components production facilities and centers producing coarse natural and artificial porous aggregates; calculated snow and wind stresses; seismicity.

The effectiveness of the comprehensive use of light-concrete components was evaluated using adjusted expenditures as determined using SN [construction norm] 508-79. Primary attention was paid to studying the effectiveness of using bearing components. Components were chosen using existing standard plans or were specially developed, but retaining the form dimensions of analogous heavy-concrete components. In all instances, the foundations chosen had flat footings of monolithic heavy concrete on a foundation of homogeneous sandy soil of average density and low moisture, with a conventional calculated pressure of 3 kg-force per square centimeter. Given natural moisture content, the density of the structural claydite-concrete was assumed to be 2,000 kg/m^3, given a claydite gravel density of 1,800 kg/m^3.

The use of light concrete in the above-grade bearing components of single-story industrial buildings lowers the weight of these components 13-19 percent as compared with heavy-concrete components. In buildings with an 18 x 6 meter column grid, this enables us to reduce the footing area, the overall dimensions of the foundation, and the reinforcing steel used (from 130 to 1,030 kg) and the concrete used (from two to five cubic meters per 1,000 m^2 of building space). However, the savings in concrete does not fully compensate for the additional expenditure of cement. In buildings with a 24 x 12 meter column grid, the weight of the bearing components is reduced by 13-14 percent just in truss beams with a lower reinforcing-bar content as a consequence of the reduction in the weight of the corrugated roofing sheet. The actual savings in steel is 250 to 900 kg per 1,000 m^2 of building space.

The adjusted expenditures of light-concrete bearing components for the building with the 18 x 6 meter column grid were approximately equivalent in all the administrative regions examined except for Irkutskaya Oblast, Vladivostok, Tomsk, Tynda and Khabarovsk. It was advantageous to use light-concrete bearing components for buildings with a 24 x 12 meter column grid in Kuybyshevakay Oblast and in Tashkent.

The use of light concrete in the bearing components of multistory industrial buildings enables us to lower their weight by 12-15 percent. In seismic regions, the replacement of heavy concrete with light does not lower the calculated seismic stresses in frame elements and does not influence the expenditure of materials. Adjusted expenditures on producing bearing components for multistory industrial buildings made of light and heavy concrete were approximately identical for all administrative regions except for Irkutskaya Oblast and Tomsk.

The use of claydite-concrete in housing permits a 33-35 percent reduction in their weight, while increasing outside bearing wall thickness from 16 to 20 cm. The use of light concrete in span, passageway and other panels permits a reduction in their thickness while retaining the sound-suppressing properties of the components. Due to the reduction in overall building weight, narrower foundation panels can be used under the transverse bearing walls. As a result, actual steel expenditures are reduced from 11.6 to 15 percent and concrete -- from two to 4.5 percent. A calculation of adjusted expenditures showed that the use of claydite-concrete in the bearing components of large-panel housing is economically expedient in all the administrative regions examined except for Irkutskaya Oblast and Tomsk.

The experience of enterprises producing reinforced concrete components for rural construction shows that dense natural aggregate (crushed rock, gravel) is supplied unevenly, raising hypothetically constant expenditures per cubic meter of prefabricated reinforced concrete. According to TsNIIEPsel'stroy data, the increase in work smoothness when heavy concrete is replaced by light reduces factory net cost by an average of four percent. It is economically expedient to use claydite-concrete bearing components in production-type agricultural buildings in all the oblasts examined. The savings in adjusted expenditures is 240 to 270 rubles per 1,000 square meters of building space.

The effectiveness of using light concrete for the bearing components of housing, industrial and agricultural buildings depends basically on the ratio of coarse porous and dense aggregate costs in the region. This ratio must not be above 1.1 for single-story industrial buildings, 1.2 for multistory industrial buildings, 1.8 for large-panel housing and 1.6 (including smoothness factor) or 1.1 (excluding smoothness factor) for agricultural buildings.

The comprehensive use of light concretes for bearing and enclosure building components improved their efficiency. It is economically justified in regions in which the ratio of coarse porous and dense aggregate costs does not exceed 1.5 in single- and multistory industrial buildings, 2.5 in large-panel housing and 3 in agricultural buildings.

With consideration of regional conditions, the combined use of components made of light and cellular concretes might help increase light-concrete construction efficiency in the country.

11052
CSO: 1821/119

SUMMARIES OF ARTICLES ON CONCRETE

Moscow BETON I ZHELEZOBETON in Russian No 4, Apr 82 (signed to press 11 Mar 82) p 31

[Abstracts of articles published in No 4 of BETON I ZHELEZOBETON]

UDC 624.012.45:691.327:666.973.2.003.13
"Effectiveness of the Comprehensive Use of Light Concrete Components," BETON I ZHELEZOBETON, No 4, 1982, p 2.
Presents results of technical-economic studies of the comprehensive use of light concretes (using claydite-concrete as an example) for the bearing components of industrial (single- and multistory) housing and agricultural production buildings, with consideration of local conditions. Criteria are established for evaluating the economic effectiveness of the comprehensive use of light concrete bearing components for various regions of the country as a function of type of construction.

UDC 69.024:666.97.033.4
Petrova, A. K., Petrov, L. A., Konochkin, N. I. and Potapov, V. A., "Improving Corrugated Panel Reinforcing and Manufacturing Technology," BETON I ZHELEZOBETON, No 4, 1982, pp 4-6.
Describes improved technological-design resolutions of corrugated roofing panels for Series 121 houses. Development of a jig for assembling and welding a modular frame and a clamp permitting the manufacture of flat rib frames in strict conformity to plan. Shows the technical-economic impact of the steps taken. Tables -- 1, illustrations -- 3.

UDC 691.022--413:691.327:666.973.2:666.64--429.3
Pinayev, I. F., Primakov, V. P., Sukhorukov, V. D., "Prestressed Blown Claydite-Concrete Wall Panels," BETON I ZHELEZOBETON, No 4, 1982, pp 6-8.
Experimental research results are given for the strength and deformation properties of blown M75 claydite-concrete and the loss of prestress in class At-VIS and A-IIIv reinforcing in elements and components made with this concrete. The possibility and appropriateness of prestressing such concrete when manufacturing the wall panels for industrial buildings are substantiated. Recommendations are given for calculating and designing these panels and the technical-economic impact of introducing them to replace standard components is shown. Illustrations -- 2, tables -- 1, bibliographic entries -- 5.

UDC 691.54.003.13
Malinina, L. A. and Brusser, M. I., "Effectiveness of Using Various Cements," BETON I ZHELEZOBETON, No 4, 1982, pp 8-9.
Two integral effectiveness indicators are proposed: relative cement expenditure and relative cement cost per unit of volume of a prescribed quality. Using brand M500 portland cement and quick-hardening brand M400 cement as examples, it is shown that the effectiveness of the cements changes sharply as a function of the concrete quality indicators required. Tables -- 1.

UDC 666.97.003.16
Azelitskaya, R. D., Chernykh, V. F. and Pshenichnyy, G. N., "Using Repeat Vibration in Plant Technology," BETON I ZHELEZOBETON, No 4, 1982, pp 10-11.
It is shown that, to achieve maximum impact, repeat vibration of the cement test and mixtures must be done with consideration of the fact that portland cement hardens in stages. Results are given for physicochemical research on the properties of models manufactured by the usual method and those made with various vibration-compacting routines. Illustrations -- 2, bibliographic entries -- 4.

UDC 691.87:691.714:539.3/.6
Mikhaylov, K. V., Mulin, N. M. and Mamedov, T. I., "New Calculated Resistance Values for Reinforcing Steel," BETON I ZHELEZOBETON, No 4, 1982, pp 12-13.
Briefly substantiates the lower safety margin for all classes of reinforcing and the correspondingly higher calculated resistances. Numerical values are given for previous safety margins and calculated resistances of reinforcing and the new values. The anticipated saving in reinforcing at the production level planned for 1985 is shown. Tables -- 2.

UDC 693.548
Grushevskiy, A. Ye., Pogorelov, S. A. and Stepanov, A. M., "Experience in Using the 'Belgorodskiy belyy' [Belgorod White] Finishing Material," BETON I ZHELEZOBETON, No 4, 1982, pp 14-15.
Describes experience in using "Belgorodskiy belyy" at ZhBI-3, Belgorod House-Building Combine. Ways of improving the technological properties and technical-economic effectiveness of using this material are shown. The technological parameters of manufacturing and the physicomechanical properties of plastic contour-shapers used to create decorative surfaces on wall panels are determined. Illustrations -- 2, bibliographic entries -- 3.

UDC 666.97.033.16
Sivko, V. I., Legostayev, A. D., Kovalenko, A. A., et al., "Improving Procedures for Vibration-Compacting Concrete in Cartridges," BETON I ZHELEZOBETON, No 4, 1982, pp 17-18.
Presents experimental research results for cartridge operation. The oscillation amplitudes of dividing plates were measured at various stages of molding by a special method using vibration probes. Recommendations are given on improving the cartridge design to improve its vibration and the quality of the articles being molded. Illustrations -- 2.

UDC 625.888:624.01.46
Kroshkin, Yu. M. and Pakhomov, V. S., "Experience in Manufacturing Prestressed Long Curbstone," BETON I ZHELEZOBETON, No 4, 1982, p 18.

Describes the technology for manufacturing 5.5-meter curbstone reinforced with two prestressed high-strength 5-mm class V-II steel wires. The economic impact of introducing the new technology at the Glavnovosibirskstroy's ZhBI-7 plant was 10,000 rubles per year. Illustrations -- 1.

UDC 627.751.4
Tsionskiy, A. L., "Improving the Effectiveness of Vibration Hydraulic-Press Pipe Manufacture and Use," BETON I ZHELEZOBETON, No 4, 1982, pp 20-21.
Offers proposals on improving the planning and production of vibration hydraulic-press pipe. Shows ways of saving high-strength wire, labor resources and thermal energy. Tables -- 1.

UDC 69.057.3
Maniskevich, Ye. S., Morozenskiy, V. L. and Pyzhov, Yu. K., "Impact Puncture Strength of the Bearing Zones of Hoisted Spans," BETON I ZHELEZOBETON, No 4, 1982, pp 21-23.
Gives research results on the effect of steel collar design on the impact-puncture resistance of bearing sections of solid reinforced concrete span plates. Plate prototype test data are given for various types of steel collars. Recommendations on refining the method of calculating impact-puncture resistance with consideration of steel collar specifications. Illustrations -- 3, tables -- 3, bibliographic entries -- 3.

UDC 666.982.24
Il'in, O. F., Shchukin, V. S. and Fel'dman, B. I., "Evaluating Minimum Reinforcing for Curved Elements," BETON I ZHELEZOBETON, No 4, 1982, pp 24-25.
Examines a new approach to designating minimum percentage of reinforcing for curved elements which is linked to calculations of mildly-reinforced elements. The necessary amount of longitudinal reinforcing is established using a calculation ensuring both strength in normal sections and strength in the reinforcing itself. A graph is given of change in minimum percentage of longitudinal reinforcing as a function of relationship M/M_T for different brands of concrete. Illustrations -- 1, bibliographic entries -- 2.

UDC 624.073
Labozin, P. G., "Calculating Multiple-Hole Panels," BETON I ZHELEZOBETON, No 4, 1982, pp 25-26.
Presents a method of calculating multiple-hole reinforced concrete panels with consideration of physical nonlinearity of the material and shear deformations. Recommendations on calculating panels for fracturing. It is shown that, with holes, the calculation of shear deformations and physical nonlinearity substantially influence panel sag. Illustrations -- 2, bibliographic entries -- 2.

UDC 624.012.45:666.97.058:665.775
Vasil'yev, N. M., "Methods of Studying Components Impregnated With Petroleum Products," BETON I ZHELEZOBETON, No 4, 1982, pp 27-28.
Presents features of methods of studying reinforced concrete components impregnated with petroleum products. Gives a method of determining concrete strength and a classification of petroleum products by degree of effect on concrete. Illustrations -- 1.

UDC 624.075.23:620.191.33
Subbotkin, M. I., Dmitriyev, A. S. and Kosheleva, L. I., "Cracking in Reinforced Concrete Columns During Building Use," BETON I ZHELEZOBETON, No 4, 1982, p 28.
Gives results of a study of building columns in one building of a packing plant. Shows that the basic cause of column cracking is concrete shrinkage as a result of the use of aggregates with high amounts of dust during concrete manufacture.

11052
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DEVELOPMENT OF GLASS AND CERAMICS INDUSTRIES DISCUSSED

Moscow STEKLO I KERAMIKA in Russian No 6, Jun 82 (signed to press 24 May 82) pp 2-3

[Article by S. F. Voyenushkin, RSFSR minister of building materials industry: "Development Prospects of the Glass and Ceramics Industries of the RSFSR Ministry of Building Materials Industry"]

[Text] Together with the entire Soviet nation, the workers of the RSFSR's building materials industry responded with great enthusiasm to the CC CPSU's resolution, "On the 60th Anniversary of Establishment of the Union of Soviet Socialist Republics."

Under Soviet rule the glass industry has changed unrecognizably. In 1926 there was opened the first Soviet mechanized window glass plant, "Dagestanskiye Ogni" [The Fires of Dagestan]. Today just one plant, the Saratov Commercial Glass Plant, produces as much window glass in a year as had been produced in the entire tsarist Russia in 1913.

The vigorous postwar development of the automotive industry, shipbuilding, and aviation necessitated developing new types of commercial glass, while the rapid increase in the speeds of transport and the rise of space technology posed qualitatively different requirements to glass products. The manufacture of products meeting the increased requirements was impossible without the introduction of new plant technologies.

The conversion of glassmaking furnaces to natural gas served to introduce high-temperature glassmaking. The concomitant introduction, at the Shcherbinka and Saratov plants, of the production of electrically melted refractories resulted in a marked prolongation of the inter-repair operating periods of glassmaking furnaces. Considerable work was accomplished to develop new chemical compositions of glass and improve the quality of raw materials. The Saratov and Salavat commercial glass plants, the Borskiy Glass Plant, and other enterprises, built highly mechanized shops equipped with advanced facilities and technologies and having a high culture of production. This led to a marked technical re-equipping of the branch as well as to advances in the effectiveness, quantity, and quality of production.

During the years of the 10th Five-Year Plan alone more than 148 million rubles was spent on the development and modernization of commercial-glass enterprises. This made it possible to put into operation capacities for the production of 20 million sq m of window glass, about 10 million sq m of polished glass, 500,000 sq m

automotive glass and, in addition, for increasing by a factor of nearly 2.5 the output of products bearing the State Quality Label.

By 1971 the last semiautomatic facilities for the production of glass containers were were replaced with their fully automatic counterparts. This was followed by the intensive introduction of high-capacity lines based on R7, AL-106, and BB-7 automatic machines, which during the 9th Five-Year Plan made it possible to expand the output of bottles by 361 million units and canning jars (in terms of 0.5-liter jars) by 351.7 million units.

Under Soviet rule shaped-glass plants acquired a totally new appearance. Pot furnaces were replaced with continuous-action tank furnaces which served to markedly augment output on the same production areas. For their industrial introduction of the continuous melting of lead crystal in tank furnaces, a large group of glass-industry workers and scientists were awarded the USSR State Prize in Science and Technology.

Following the increase in output it was necessary to increase the labor productivity of the workers engaged in shaping and decorating glass products while at the same time preserving the traditions and high quality of Russian crystalware, which has gained fame on the foreign markets. This could be accomplished by introducing a conveyor-flow organization of labor, using synthetic-diamond tools, and developing new high-speed machine tools of the SAG-2M, SAG-3, SAG-4, ShAG-2, and ShAG-3 types based on hydrodynamic and aerostatic bearings.

The marked expansion of the output of crystalware during the 8th and subsequent Five-Year Plan periods necessitated improving the polishing techniques. Mechanical polishing was supplanted by chemical polishing. The merit for this largely belongs to the workers of the Gusevskiy and Dyat'kovskiy crystalware plants and the Leningrad Artistic Glass Plant.

Mechanized lines for the production of glassware began to be broadly introduced in the early 1970s: glasses, salad bowls, and other tempered-glassware, at the Urshel'skiy and Borskiy glass plants; and goblets at the Kalinin and "Krasnyy May" [Red May] glass plants. The D'yatkovskiy Crystalware Plant began to master the production of compression-molded crystalware with the aid of the APP-12 automatic press: this made it possible to increase the output of glasses of various sizes and salad bowls by a factor of 5-6.

During the 10th Five-Year Plan period a set of measures to retool the plants was carried out: the work to convert the plants from liquid fuels to natural gas was basically completed and more than 50 IPSh-17 and IPSh-19 semiautomatic machines as well as more than 400 diamond-tipped SAG-2M, SAG-3, and SAG-4 machine tools were introduced.

Jointly with the Gusev Affiliate of the GIS [State Institute for the Design and Planning of the Glass Industry], the Kalinin and "Krasnyy May" plants developed and introduced techniques for decorating consumer glassware with multicolored decals and thermoplastic paints. The Saratov Plant put into operation a high-capacity technological line for the fabrication of goblets with patterned stems.

This made it possible to more than double labor productivity in the last 10 years while at the same time relieving some 5,000 workers for other purposes and increasing the output of glassware by a factor of 3.2.

More than 150 different shapes of glassware are being produced with the State Quality Label. Their exports have breatly increased.

Extensive work is being done to update the variety of output. Each year about 120-150 new types of glassware are introduced. At international expositions the high quality of the products of the Leningrad, D'yatkovskiy, "Krasnyy May," and Gusevskiy plants has been singled out.

Under Soviet rule the ceramics industry has been virtually reborn. All the large ceramics plants (except the Kirov Porcelain Fixtures Plant and the Armavir Building Materials Combine) have been built in the last 20-25 years. At present. ceramic building materials and products are manufactured by 14 specialized plants and at 12 shops of other enterprises within the ministry's system.

In 1980 the ministry's enterprises supplied to the country's construction sites 60 percent of all plumbing fixtures, 45 percent of acid-resistant products, 37.5 percent of construction pipe, 31 percent of wall tiles, 22 percent of floor tiles, and 19 percent of tiles for building facades.

Since 1970 the branch's enterprises have been undergoing a retooling based on the introduction of completely new technologies. High-capacity facilities for the dissolution of clay and grinding of thickeners have been mastered and tower spray-dryers for pressing compounds introduced. In tile production, tunnel kilns have been replaced with high-capacity conveyor-flow lines. The unit capacity of the newly introduced conveyor lines amounts to 700,000 and 1,000,000 sq m of tiles annually. The use of this equipment served to reduce to one-twentieth the time of technological processes in tile production and to double the output of products in category 1 of quality while at the same time markedly reducing technological losses.

The production of plumbing fixtures has been streamlined by introducing general-purpose glazing conveyor lines and general-purpose suspension-type conveyor dryers based on R-100 cradle-type conveyors. Mechanized benches serving to increase labor productivity by at least 20 percent are being introduced in the casting of plumbing fixtures, and they result in improving the quality of the castings and reducing the waste of semifinished products. Up to 70 percent of plumbing fixtures is produced from porcelain batches that markedly improve their performance and hygienic qualities while at the same time prolonging service life. Jointly witht the NIIstroykeramika [Scientific Research Institute of Structural Ceramics], the ceramics plants are working to develop new types of plumbing fixtures meeting modern requirements.

The enterprises manufacturing ceramic structural pipe are introducing a technology that serves to increase by 20 percent the length of any pipe section.

In the production of acid-resistant products the replacement of annular kilns with tunnel kilns is being completed. The Voronezh Porcelain Plant is introducing the branch's first automated process control system in tile production.

More than 12 percent of ceramic materials and products is manufactured with the Quality Badge, and the volume of output of single- and multiple-color and seriographically coated ceramic tiles has increased to 73 percent of overall output.

During the 11th Five-Year Plan period the retooling of the glass and ceramics industries is continuing. New capacities for the production of commercial glass are to be put into operation; the Misheronskiy Plant will introduce rolled-glass production lines with a capacity of 2.5 million sq m; the Shcherbinskiy Plant intends to organize the production of shaped fused refractories, and the "Sernoye" Mining and Concentrating Combie will put into operation sand-concentrating lines.

Plans exist to install new capacities for the production of electrically heated glass (0.6 million units) at the Borskiy Plant, frosted glass at the "Velikiy Oktyabr'" Plant (240,000 sq m), tempered (500,000 sq m) and mirror (1 million sq m) glass at the Saratov Plant, and automobile headlights (1.2 million) at the Chernyatinskiy Plant. The Skopin Plant plans to manufacture 2.5 million rubles of crystalware and the Kaluga Plant, 2 million rubles. In addition, the Kaluga Plant will organize the production of "sigran" in the amount of 100,000 sq m annually.

Considerable work must be done to further improve the technical level and effectiveness of production at glassware plants, with special attention being devoted to the mechanization and automation of auxiliary processes: the modernization of batching and proportioning-mixing shops at nine plants, the conversion of glass-making furnaces to electric and gas-electric melting, the replacement of 510 SAG machine tools with the more productive SAG-2M and ShAG-2, the introduction of machine tools for annular and longitudinal patterning of glassware, the modernization of chemical polishing facilities, and the introduction of the packing of glassware in heat-contracting sheeting.

Attention will be focused on retooling the glass-container enteprises. In 1982 the "Trud" and Ordzhonikidze glass plants will introduce automated lines, which will serve to increase by 150 million units the output of glass containers for foodstuffs.

In accordance with comprehensive programs for the solution of scientific and technological problems, new glass-shaping equipment will be developed for the production of narrow-necked glass containers at the rate of 150 containers per minute, along with rotary automatic lines for the production of glass containers.

The 1981-1985 Five-Year Plan targets a further increase in the production of structural ceramics. Capital outlays are being chiefly invested in the modernization and retooling of the existing enteprises,which will make it possible to attain the output targets and improve the quality of production as well as working conditions.

In 5 years the output of wall tiles should increase 125.6 percent; floor tiles, 157.6 percent; building-facade tiles, 132.9 percent; plumbing fixtures, from 5,800,000 to 6,800,000 units; and utility pipe, from 4,900 to 6,450 conditional kilometers.

The targeted comprehensive programs envisage the development and introduction of a technology reducing the kiln temperature of plumbing fixtures by 80-100°C, the development of batches based on local clays with admixtures of the wastes of chemical and other sub-sectors of industry, and the mechanization and automation of production processes and especially of the sorting and packaging of finished products.

During 1984-1985 the construction of yet another large enterprise--the Pskov Ceramics Combine, will be completed.

During the Five-Year Plan period industry will introduce 15 automated continous-flow conveyor lines for the production of a broader variety of ceramic tiles, 130 complex-mechanized facilities for the casting of plumbing fixtures, and other equipment.

The enterprises are paying considerable attention to assuring safe and hygienic working conditions for their personnel. Since 1965 more than 35 million rubles has been spent on these purposes in the glass industry, and about 8 million rubles in the ceramics industry. During that period, the enterprises of the glass and ceramics industries introduced more than 25,000 measures to improve safety engineering and blocking and signaling systems; 65 enterprises modernized dust-collecting facilities; and other plants carried out general overhauls of intake-and-exhaust ventilation systems, thus resulting in a marked improvement in working conditions. All this made it possible to reduce work injuries in the glass industry by a factor of 3.5 and in the ceramics industry to less than one-sixth.

To fortify the health of workers, more than 30 glass and ceramics plants built rest homes, sanitariums, tourist facilities, and recreational facilities.

The sweeping competition to improve working conditions and elevate the culture of production resulted in awarding the honorifics "Enterprise of Communist Labor" and "Enterprise With a High Culture of Production" to 19 collectives of the glass industry and 5 collectives of the ceramics industry.

Translating into reality the decisions of the 26th CPSU Congress, the collectives of the glass and ceramics industries take an active part in the socialist competition for the fulfillment and overfulfillment of the tasks of the Five-Year Plan under the slogan "Work effectively and do a quality job!" The initiators of the competition were the collectives of the Saratov Commercial Glass Plant, the Ryazan' Acid-Resistant Products Plant, and the Borskiy and Kalinin glass plants.

For their achievements in the 1981 All-Union Socialist Labor Competition, the collectives of the Borskiy and Saratov plants were awarded the challenge Red Banners of the CC CPSU, the USSR Council of Ministers, the VTsSPS [All-Union

Central Council of Trade Unions], and the Komsomol CC, and their names were inscribed on the All-Union Board of Honor at the Exposition of Achievements of the USSR National Economy, while the collectives of the Leningrad Artistic Glass Plant, the Gusevskiy and D'yatskovskiy Crystal Plants, the Pervomayskiy Glass Plant, and the Plant imeni Sazonov were awarded the challenge Red Banners of the RSFSR Council of Ministers and VTsSPS.

Orders of the USSR were conferred upon 13 enterprises, while an additional six were granted the name of collectives of communist labor and the Borskiy Glass Plant--the leading enterprise of the branch--was awarded the name "Model Enterprise of the USSR Ministry of the Building Materials Industry."

The glass and ceramics plants employ 12 Heroes of Socialist Labor, including the leader of the brigade of glass-drawing machine operators at the Saratov Plant, V. S. Prosvirnin, the grinder N. V. Vasil'yeva at the "Krasnyy May" Plant, and the tower-dryer operator Ye. T. Anokhina at the Voronezh Plant.

The socialist labor competition for a worthy welcome of the 60th anniversary of the USSR and fulfillment and overfulfillment of the 1982 Plan for Economic and Social Development as well as of the tasks of the 11th Five-Year Plan has become widespread. The collectives of the ministry's enterprises will greet the 60th anniversary of the USSR with pace-setting feats of work and high production indicators.

1386
CSO: 1821/148

CEMA COOPERATION IN MANUFACTURING INDUSTRY SURVEYED

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 3, Mar 82 pp 105-108

[Article by I. Vishnyakova: "International Specialization of the USSR's Manufacturing Industry"]

[Text] In the present stage the international socialist division of labor is closely bound up with an increase in production specialization and industrial cooperation. "The CPSU and other fraternal parties," L. I. Brezhnev remarked at the 26th CPSU Congress, "have charted a course toward turning the next two 5-year plans into a period of intensive industrial and scientific-technical cooperation among the socialist countries."* Following this course essentially strengthens the planning foundations of cooperation and promotes dynamic and stable development of the national economies. Specialization of the manufacturing industry has particular importance at the international level.

The USSR is the world's largest supplier of varied equipment for heavy industry, power installations, high-precision machine tools, electronic instruments, and so on. Attention to specialization of the manufacturing industry is naturally on the rise. This is indicated, to be specific, by the decree of the CPSU Central Committee and USSR Council of Ministers adopted 12 July 1979 and entitled "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality," which calls for drafting measures aimed at adoption of standards and specialization of the production of products used throughout machinebuilding on the basis of highly efficient technology and engineering. The task is to see that products are manufactured whose technical level and quality meet or exceed the best Soviet and foreign examples. This is especially important to establishment of stable international cooperative relations specifically in the manufacturing sectors.

A foremost condition for exchange of specialized products (parts, assemblies, units, semifinished chemical products, and so on) is that the enterprises of our country and cooperating enterprises of other socialist countries have the same technical and technological level and the same standards with respect to the parameters and quality of products they produce. Taking into account the

* "Materialy XXVI s"yezda KPSS" [Materials of the 26th CPSU Congress], Moscow, Politizdat, 1981, p 7.

increased cost of manufacturing equipment, especially in the progressive branches (electronics, the radio equipment industry, organic synthesis, and so on) on the one hand, and on the other the high productivity of present-day machinery, it is economically advisable for the major enterprises of the CEMA member countries to specialize in the production of individual products or components. The specialization of machinebuilding enterprises in the production of parts would alone be able to raise labor productivity 3-5-fold, increase the size of the production run of assemblies 4-6-fold, and reduce production cost 30-50 percent.

Production specialization and industrial cooperation at the intergovernmental level, once it became the main methodological principle of the Comprehensive Program for Socialist Integration, has been having an impact on the national economy. The long-range target programs for cooperation of the CEMA countries are now determining the specific plans for development of individual production sectors in accordance with bilateral and multilateral intergovernmental agreements.

Agreements have been concluded in recent years on multilateral international specialization and industrial cooperation concerning mining equipment; machines and assemblies manufactured at the enterprises of nonferrous metallurgy; machines and equipment for the production of lumber and semifinished products made with lumber; and specialized measuring and testing devices for line communications. Revisions have been made in agreements on international specialization in the production of machines and equipment for the garment industry, the knitwear industry and the textile industry, the production of automatic measuring and monitoring equipment for the bearing industry, the production of components and assemblies for metal-cutting machine tools, etc. A multilateral agreement was signed at the 35th CEMA Session on creating a standardized set of basic electronic components for production of radioelectronic apparatus, communications equipment and computers, which will make it possible to satisfy the needs of the socialist countries for microprocessing equipment.

Gradually, in accordance with the rise of the technical level and taking into account regional peculiarities of production, the directions of international specialization of the manufacturing industry are taking shape in the USSR as well as in the other socialist countries. The national economy's need for the products of manufacturing sectors and the general trends of cost reduction per unit output are constantly operative incentives for more elaborate production specialization in the international socialist division of labor. This makes it possible to achieve in the sector a sizable economic benefit not based on investments, since a lower manufacturing cost for a product being exported than the level of export prices affords indisputable advantages to the specialized production operation. Here the drop in production cost is manifested all the more noticeably, the more time is spent in manufacturing the product. That is why the national foundation of international production specialization in the manufacturing sectors will even in the future continue to be its principal condition and necessitates a further expansion of intra- and interregional cooperation.

At the present stage all the prerequisites exist in the USSR for more elaborate specialization in the manufacturing of products for export. The Basic Directions for the Economic and Social Development of the USSR Over the Period of 1981-1985 and Up to the Year 1990 has set the task of continuing the effort to organize export production operations, to improve the composition of exports, above all by increasing the production and deliveries of the products of machinebuilding and other finished products meeting the requirements of the external market, of constantly improving their technical level and quality, and of expanding the list of export goods.

In our country the trade balance of the manufacturing industry still shows a deficit, though the overall trade balance is in equilibrium. We can expect that intensification of international specialization of the USSR manufacturing industry will contribute to improvement of the composition of exports, since this affords an additional possibility of paying for deliveries of imports.

In accordance with the long-term trade agreement, the export of machines and equipment in the mutual trade of the CEMA member countries has been almost doubling every 5 years: it was 27 billion rubles in the 1966-1970 period, 52 billion in 1971-1975, and 90 billion in 1976-1980. Along with improvement of the domestic production structure of the manufacturing industry, the Soviet Union has been intensifying specialization of the manufacture of agricultural machines, tractors, trucks, equipment for nuclear power stations, complete processing installations, computer equipment, polymer materials and the products of woodworking. Foreign trade relations among CEMA countries have been influenced by many factors, including international production specialization: increasing the economic efficiency of the national economy as a whole also depends on its development.

In solving the specific problems of the specialization of the USSR's manufacturing industry in the context of integration it is important to take into account the growth of heavy industry, whose products, which are distinguished by a high content of metal, are widely represented in the volume of foreign trade. The socialist countries, which have limited metal resources, meet their need for them in part by importing from our country. At the same time, as the figures presented in the table show, at the end of the seventies imports of metal-intensive products of machinebuilding to the Soviet Union from the other CEMA member countries increased.

In 1979 our country's exports of the products of machinebuilding amounted to 7.43 billion rubles, among which metal-intensive models accounted for 2.4 billion rubles; imports of the same product were 14.39 billion and 4.81 billion rubles, respectively. Thus the value of imports of metal-intensive products was more than twice that of exports of the same products. Aside from the rise in the prices of machines and equipment, one specific explanation for this is that every CEMA country has in the years of socialist construction emphasized the building of the branches of heavy industry, both the traditional ones (railroad-car building and shipbuilding), as well as the new ones (production of power engineering and chemical equipment, materials-handling equipment, etc.), counting on metal from the large combines in ferrous metallurgy built with aid from the USSR. But the growth of heavy industry and updating the

models of machines and equipment produced are requiring more and more metal. That is why the problem is arising of adjusting the exchange of imports and exports of metals and metal-intensive products of machinebuilding between the USSR and the socialist countries of CEMA. The way to solve the problem is to go further with coordination of the national economic plans for development of the countries and to intensify production specialization of the manufacturing industry.

Foreign trade statistics indicate that the USSR's imports of products of specialized production operations increased as follows between 1970 and 1976: 2.4-fold for specialization based on the complete product, 2.7-fold for specialization based on assemblies, and 3.7-fold for specialization based on parts. In future cooperation will be more intensive in agricultural machinebuilding, the aircraft industry, and the production of trucks, equipment for nuclear power stations, and ships and platforms for exploring and developing oil and gas deposits on the shelves of seas and oceans. The 35th CEMA Session recognized the need to speed up joint development of machine complexes for open-cut working of minerals and for construction of main gas pipelines, energy-saving equipment, and up-to-date equipment for production process control.

Exports and Imports of Metal-Intensive Products of Machinebuilding and Ferrous Metals Between the USSR and the European Socialist Countries in 1979, in millions of rubles

Country	Ferrous Metals (pig iron, rolled steel products, pipe)		Metal-Intensive Products of Machinebuilding	
	Export	Import	Export	Import
Bulgaria	201.8	6.8	288.8	24.4
Hungary	157.4	17.4	113.1	110.4
GDR	656.2	--	132.6	829.3
Poland	226.7	35.7	270.9	411.0
Romania	110.0	70.6	137.0	122.0
Czechoslovakia	96.9	--	107.1	578.2

Source: "Vneshnyaya torgovlya SSSR za 1979 g." [USSR Foreign Trade in 1979], Moscow, Statistika, 1980.

Since the date of signing of the Comprehensive Program for Socialist Economic Integration the Soviet Union has signed within the framework of CEMA about 120 multilateral agreements on specialization of production of products of machinebuilding. The relative share of deliveries of products resulting from specialization has reached 34 percent among CEMA member countries for the group "Machines and Equipment." Long-range programs for cooperation between the USSR and the European CEMA countries have become a new form for strengthening the country's production specialization. Documents signed with Bulgaria and the GDR for the period up to 1990 figure as master charts of specialization and cooperation in the field of physical production on a bilateral basis.

Since the USSR has the most highly developed production structure of the manufacturing industry of all the CEMA countries, expansion of the range of deliveries of industrial goods on the basis of specialization to the foreign market has a sound basis within the country. But not all deliveries in foreign trade result from specialization. The main reason for this is the considerable demand for the products of manufacturing sectors within the country and the fact that in a number of cases deliveries from the USSR are determined by the need to maintain the relations embodying integration.

International specialization (especially the forms of specialization by element) is widely developed in the USSR's motor vehicle industry. Multilateral agreements of the CEMA member countries call for the manufacture of equipment for the servicing and diagnosis of motor vehicles and of transportation equipment for sanitation departments of settlements and so on. There will be further development of cooperation between the USSR and other CEMA member countries in the field of specialized production of equipment for nuclear power stations. Putting them on line in the socialist countries will afford an annual saving of more than 70 million tons of standard fuel. That will mean a saving of valuable hydrocarbons used to meet the country's domestic needs, and at the same time it will intensify specialization in the production of power machinebuilding.

In the coming period the CEMA countries will be making larger capital investments in production of heavy and one-of-a-kind metal-cutting machine tools, machine tools with numerical programmed control, including "machining centers"; there will be an increase in the output of automatic production lines, automated forging and pressing equipment and mechanization and automation equipment; and standardized complexes of foundry equipment and industrial robots and manipulators of various types will be put into production. Projects have been organized which are aimed at international specialization and industrial cooperation not only concerning finished products, but also assemblies, parts and other components both in machinebuilding and also in the radio equipment and electronics industries.

The Soviet Union is constantly increasing its exports of complete sets of equipment; in 1979 it delivered such equipment for 740 projects in 46 countries, including all the CEMA countries. These projects include power stations of various types, enterprises in ferrous and nonferrous metallurgy, plants for the production of diesel motors, metal structural fabrications, television sets and radios, enterprises of the chemical and petrochemical industry, light industry and the food industry. Complete equipment has already been delivered for the caustic soda plant at Giurgiu Dej (Romania), for the rolling-element bearing combine at Debrecen (Hungary), for the aluminum shapes plant at Shumen (Bulgaria) and other projects.

It is natural that international industrial specialization concerning certain products of the manufacturing industry should coincide with internal specialization. But this coincidence occurs only if the product being produced displays high quality, as is the case, for example, with the Belarus' tractors, whose specialized manufacture has intergovernmental importance. This might be referred to as conjugate international specialization. It is typical of the

manufacturing sectors of the USSR, whose enterprises are manufacturing volume products and are concentrated in the major industrial centers. When the product of a sector has relatively small domestic sales and is mainly exported, then we have what is called direct international production specialization. It is less typical of our country's enterprises and more characteristic of the major specialized sectors of the European socialist countries--shipbuilding in the GDR and Poland, the manufacture of buses in Hungary, etc.

Conjugate and direct international specialization and industrial cooperation guarantee not only a rise of labor productivity, improvement of the production structure and the earning of profit, but also socioeconomic benefits: a rise in the level of skills of personnel employed in manufacturing the specialized products, a rise in the wages and augmentation of the bonus fund of enterprises, and improvement of working conditions in the workplace. Production specialization thus promotes achievement of the main social goal of socialist society--the higher prosperity of the workers.

The concentration of the production for export of the manufacturing sectors is increasing steadily. Ever more frequently the activity of the country's enterprises and associations is becoming a part of the activity of international economic and business organizations within the framework of the CEMA member countries. This is the most progressive form of deepening and reinforcing the international specialization of individual manufacturing industries. It presupposes at the same time a concentration of services at the intergovernmental level. For instance, international business organizations perform an important role in the organization of production. In most of them the USSR occupies the dominant place: for example, in Intertekstil'mash, Interatomenergo, Interelektro, Interkhim, etc.

Thus the economic processes embodying integration are intensifying and deepening the specialization of the export industries, most of which are located predominantly in the European part of the USSR. Such very large centers as Moscow, Leningrad and Minsk, which have a large scientific-production capability, are specializing in deliveries of the products of power machinebuilding, machine tool building, tractor building and motor vehicle building.

Displacement of the export industry to the eastern regions of the country under the influence of international specialization involves additional capital investments for the development of transportation, the infrastructure, water supply, and so on. That is why in preparing designs of TPK's [regional industrial complex] within the country it is indispensable to take into account the growing importance of international specialization of the manufacturing industry and the level of involvement of production centers in the sphere of cooperation embodying integration.*

* This principle reflects only one of the aspects of the formation of intersector complexes within the country (see V. F. Pavlenko and V. S. Varlamov, "Territorial'noye razvitiye narodnogo khozyaystva" [Regional Economic Development], Moscow, Ekonomika, 1981, p 21).

International specialization and cooperation are having a constructive impact on the development of the manufacturing sectors: the capital-labor ratio is rising at enterprises; the technology is improving for the production of products to be delivered to cooperating countries in amounts set forth in intergovernmental agreements; production itself is becoming more efficient; and the sphere of distribution of products of TPK's is expanding (their share in deliveries through foreign trade organizations is increasing).

A comprehensive approach needs to be taken to the TPK's taking shape with a view to foreign economic cooperation: the value of the imported equipment located within the complex must be in line with the value of the entire output produced. But since the payoff period of equipment does not coincide in every sector with the repayment period for credit, the calculation of the annual benefit in the TPK from exporting products will depend on the performance indicators of the entire sectors.

L. I. Brezhnev noted at the November (1981) Plenum of the CPSU Central Committee that the carefully weighed and thought-out development of foreign economic relations, above all the deepening of cooperation with the socialist countries--constitutes an important potential for increasing the efficiency of our own economy. It would seem that improving the forms of international specialization of the USSR's manufacturing industry would promote utilization of that potential.

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